

Urinary Excretion of Free Alpha-Amino Acid Nitrogen by Normal Infants and Children. (19828)

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Quantitative data on the urinary excretion of alpha-amino nitrogen by adults have been published by Van Slyke, *et al.*(1), Albanese and Irby(2,4), and by Thompson and Abdulnabi(3). Van Slyke, *et al.*, and Thompson and Abdulnabi used the gasometric-ninhydrin-CO₂ method devised by the former, while Albanese and Irby used their adaptation of the copper method of Pope and Stevens. There are, however, no reported values for the excretion of alpha-amino nitrogen by infants and children. This paper is concerned with the excretion of free alpha-amino acid nitrogen by normal infants and children, as determined by the gasometric-ninhydrin method of Van Slyke. The study was prompted by the absence of normal values in the literature, which were needed for comparison with values of alpha-amino nitrogen obtained from the urine of infants with diarrhea who were being given parenteral amino acid containing solutions.

Material and Methods. Twenty-four hour urine specimens were collected from 39 normal infants, premature infants and children. The urine was preserved with thymol and free alpha-amino acid nitrogen determinations were done the day the collection ended or the day after. All the individuals used in this study were well nourished, healthy infants and children. The children were the offspring of staff members of the Children's Medical Center or the Harvard Medical School, or ambulatory convalescent children residing at the Wellesley Convalescent Home. The infants were normal newborns or pre-

matures from the Boston Lying-In Hospital, or the Infant's Hospital. All were on a normal diet which was in no way controlled. After the urine samples had been incubated with urease to destroy the urea, the free alpha-amino acid nitrogen of the urine was determined by the gasometric-ninhydrin-CO₂ method of Van Slyke, MacFadyen, and Hamilton(1). The results were expressed in mg alpha-amino acid nitrogen per day, and for convenience these were calculated in mg per lb of body weight per day. A total of 48 determinations were done on 39 individuals. Determinations were done more than once on several of the infants and prematures and there were 3 children upon whose urine determinations were made on two occasions.

Results. (See Table I).

Discussion. Table I indicates that the free alpha-amino acid nitrogen excreted in the urine of the children tested was about 1 mg per lb per day. There was no sex difference such as that found by Thompson and Abdulnabi(3) in their study of normal adults. The values found in this study were also appreciably lower than those reported in adults by them and by Albanese and Irby(2) and Albanese, *et al.*(4). The results obtained from infants and prematures, on the other hand, show an average daily excretion of about 3.9 mg per lb, and the difference between infants and children was statistically significant ($p < .01$). This is in agreement with Barlow and McCance(5), as well as

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TABLE I. Urinary Excretion of Free Alpha-Amino Acid Nitrogen.

Age group	No. subjects	Sex	Mg lb/day		t	P
			Mean	Range		
Children 2-12½ yr	34	Both	1.15	High 1.98		Male-Female
	17	F	1.09			
	17	M	1.18	Low .71	.81	>.4
Infants 1 day-3 mo.				High 14.60		Children-Infant
Prematures 3 days-3 mo.	14	Both	3.86	Low .82	4.41	<.01

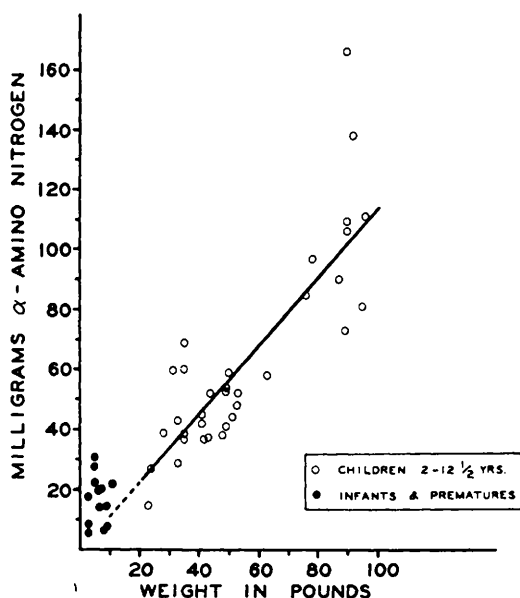


FIG. 1. Urinary excretion of free alpha-amino nitrogen by infants and children of various ages, expressed on a body weight basis.

Simon, and Goebel(6), who show that the proportion of total nitrogen excreted, attributable to alpha-amino acid nitrogen, was higher in the newborn and premature than in adults. Fig. 1 illustrates the results graphically and indicates that except for an occasional value, approximately 1 mg of alpha-amino acid nitrogen is excreted per pound of body weight, excluding the values for infants. The solid line represents the

calculated mean for the determinations done on children. The broken line extension shows that among the values of free alpha-amino acid nitrogen for infants, all but 2 are above the calculated mean for children.

Summary. A series of 48 determinations of free alpha-amino acid nitrogen was done on the urine of 39 infants, premature infants, and pre-adolescent children. The children excreted approximately 1 mg per lb per day; the infants and prematures approximately 3.9 mg per lb per day. This difference is statistically significant. The values for children were lower than those reported for adults, and no sex difference was found.

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Distribution of C¹⁴-Labeled Alloxan in the Tissues of the Rat and its Mode of Elimination.* (19829)

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A recent paper by Lee and Stetten(1) deals with the metabolism of alloxan-2-C¹⁴ and alloxan-1,3-N¹⁵ in rats. Following intra-peritoneal administration of diabetogenic doses of these compounds, the isotopes were

rapidly eliminated, chiefly by way of the urine. While the exact nature of the N¹⁵-containing urinary excretory products was not determined, it was shown that they were neither ammonia nor urea, and probably not alloxan or alloxanic acid. The pancreas took up relatively small amounts of the labeled compounds.

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